



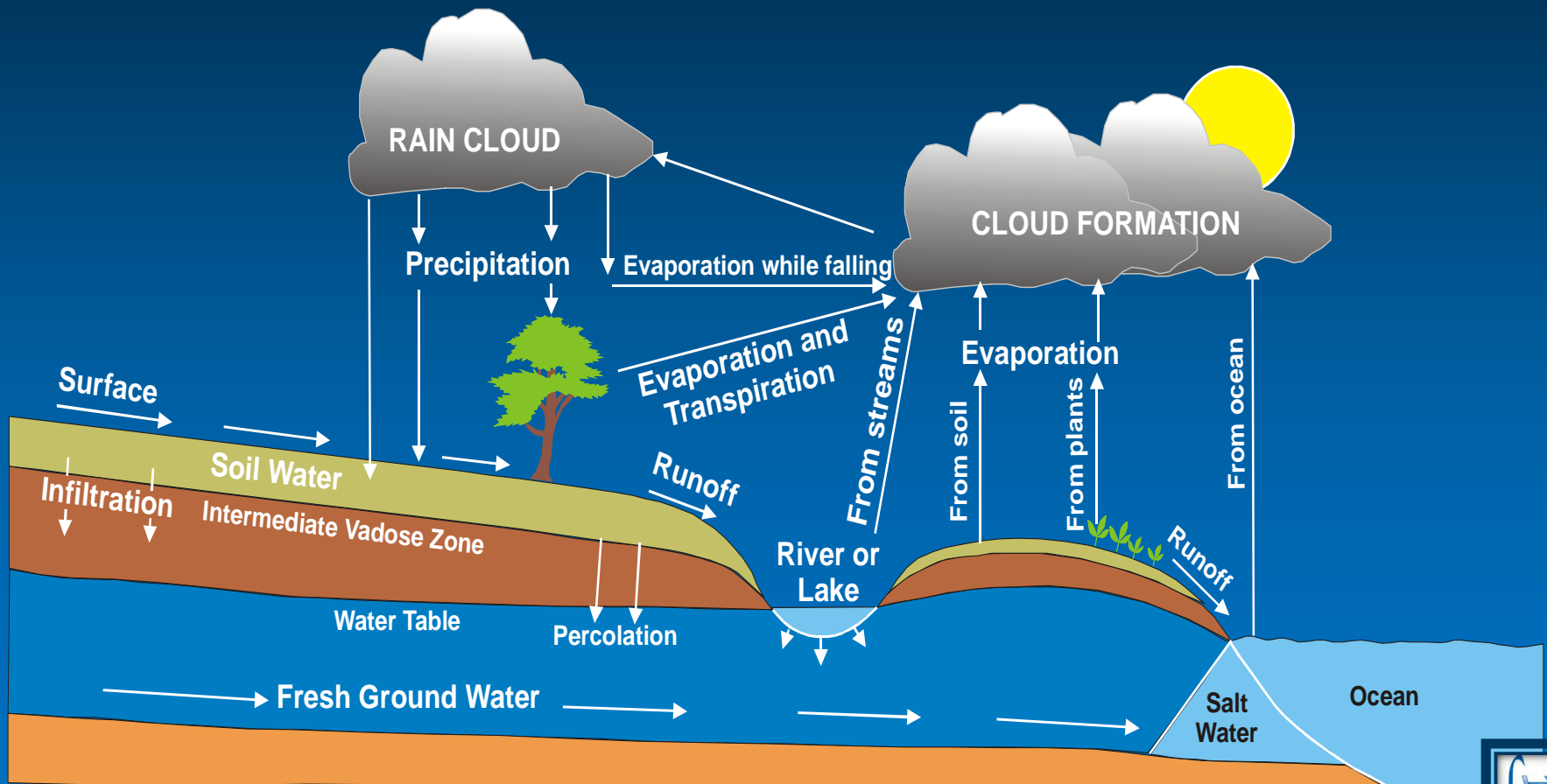
BASIC PRINCIPLES OF COLORADO WATER LAW AND WATER RIGHTS VALUATIONS

LYTLE WATER SOLUTIONS, LLC
www.lytlewater.com

KW COMMERCIAL
AUGUST 25, 2016



HYDROLOGIC CYCLE



COLORADO WATER RESOURCES

- TRIBUTARY
 - RIVERS
 - AQUIFERS ASSOCIATED WITH RIVERS
 - SHALLOW AQUIFERS RECHARGED BY PRECIPITATION
- NONTRIBUTARY / NOT-NONTRIBUTARY
 - DENVER BASIN

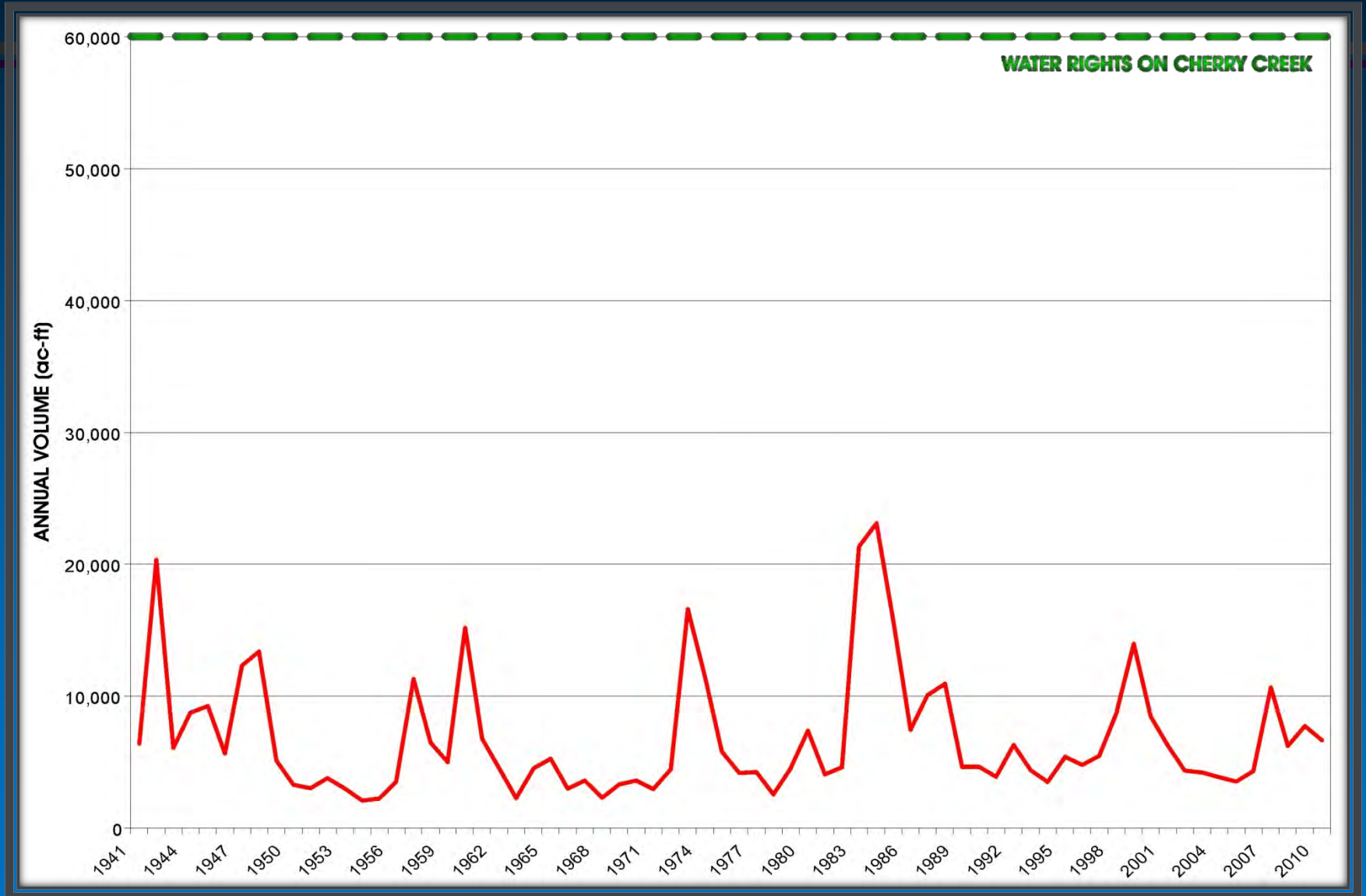


PRINCIPLES OF TRIBUTARY WATER

- DOCTRINE OF PRIOR APPROPRIATION
 - ↳ “FIRST IN TIME, FIRST IN RIGHT”
- USE IT OR LOSE IT
- EVEN RENEWABLE WATER IS FINITE IN VOLUME
- IMPORTANT FACTORS TO EVALUATE
 - PRIORITY DATE
 - DECREED USES
 - HISTORIC USE
 - RELIABILITY



WET WATER vs PAPER WATER



TRIBUTARY WATER RIGHTS

- ❖ DIRECT FLOW
- ❖ SHALLOW WELLS
- ❖ AUGMENTATION PLANS
- ❖ EXCHANGE
- ❖ STORAGE



DIRECT FLOW RIGHTS

- WATER TAKEN DIRECTLY FROM A STREAM VIA A DITCH
- AVAILABILITY BASED ON PRIORITY DATE AND FLOW AVAILABILITY
- GENERALLY THE MOST SENIOR RIGHTS ON A STREAM



SHALLOW WELLS

- WATER PUMPED FROM WELLS ADJACENT TO STREAMS
- IMPACTS TO STREAM FLOWS HAVE TO BE ADDRESSED
- GENERALLY JUNIOR RIGHTS IN PRIORITY SYSTEM
- NEED AN AUGMENTATION PLAN TO OPERATE TRIBUTARY WELLS

AUGMENTATION PLANS

- DIVERT WATER WHEN OTHERWISE WOULD NOT BE ALLOWED
- HAVE TO AUGMENT STREAM FLOW TO EXTENT OF YOUR DEPLETION UPSTREAM OF CALLING RIGHT

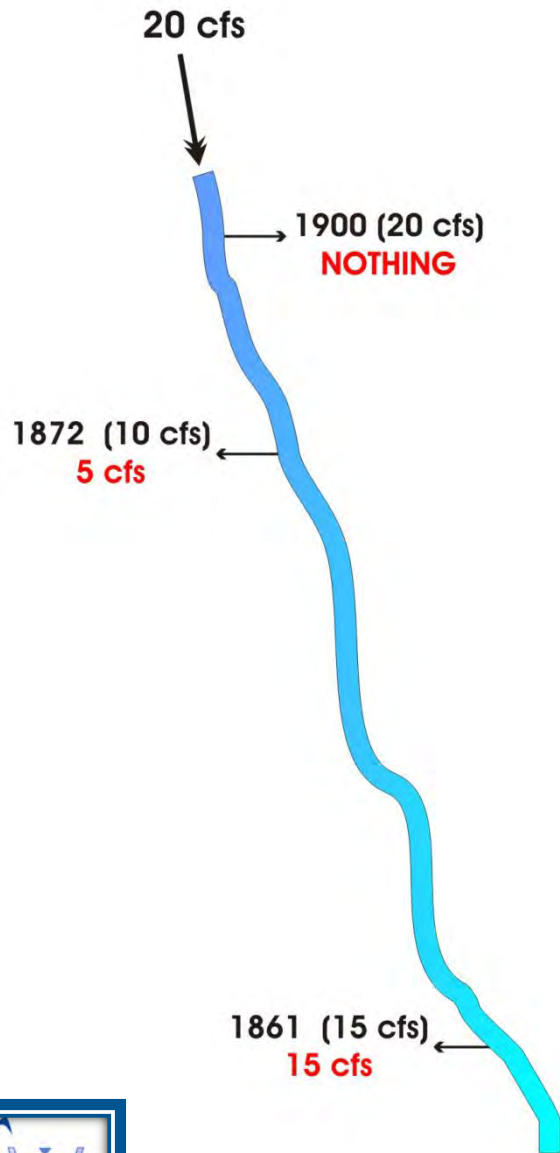


EXCHANGE

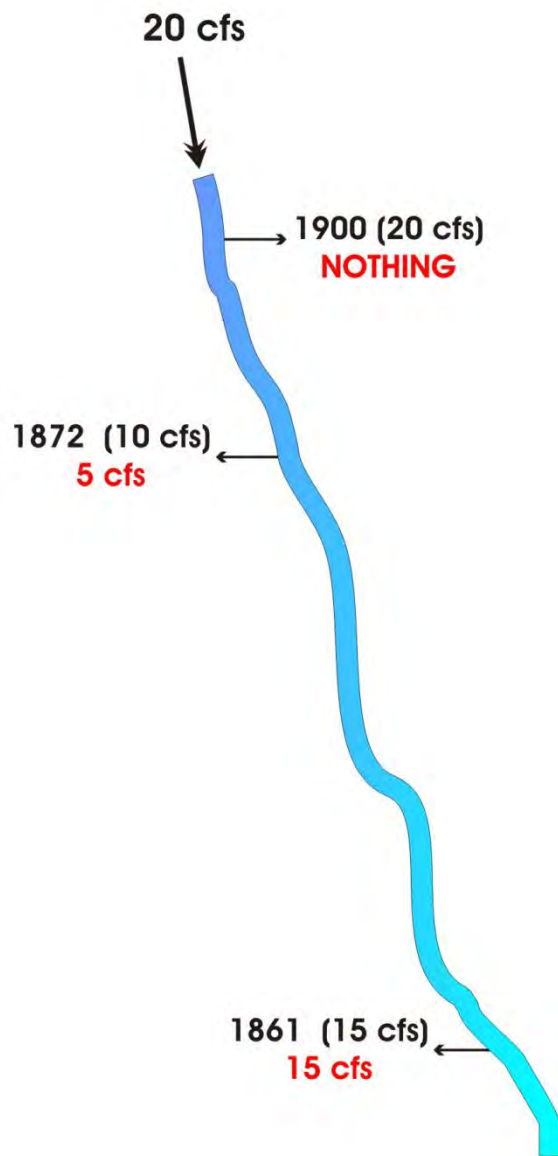
- HAVE A DECREED RIGHT AND LOCATION TO DIVERT BUT WANT TO TAKE WATER UPSTREAM
- CAN EXCHANGE WATER TO A DIVERSION POINT UPSTREAM AS LONG AS INTERVENING RIGHTS SATISFIED



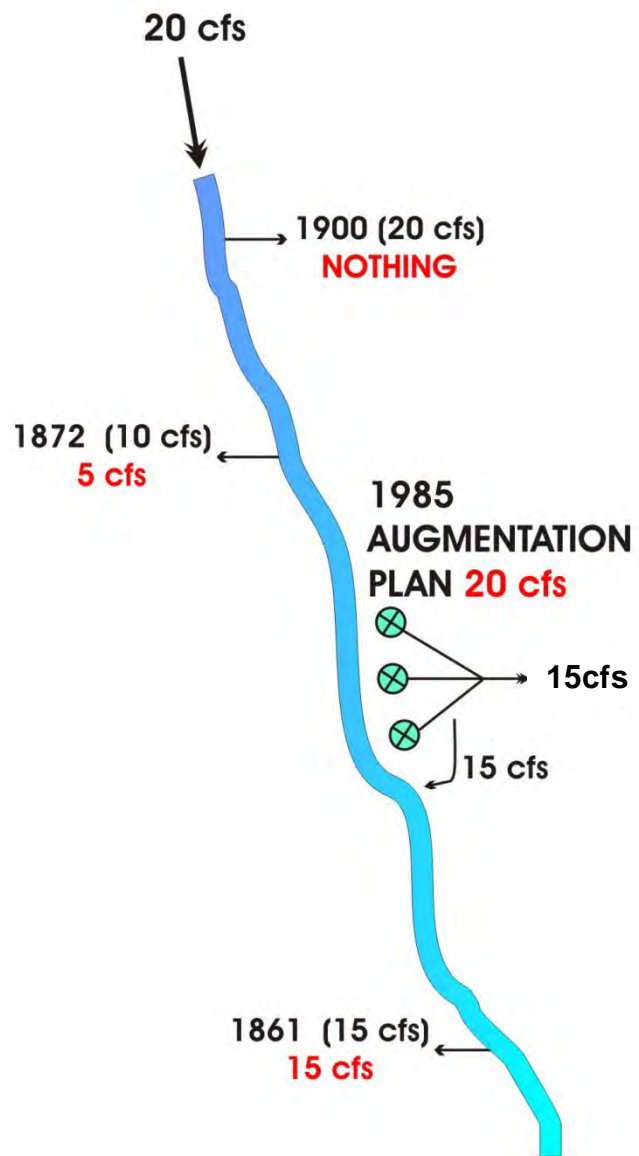
DIRECT FLOW RIGHTS



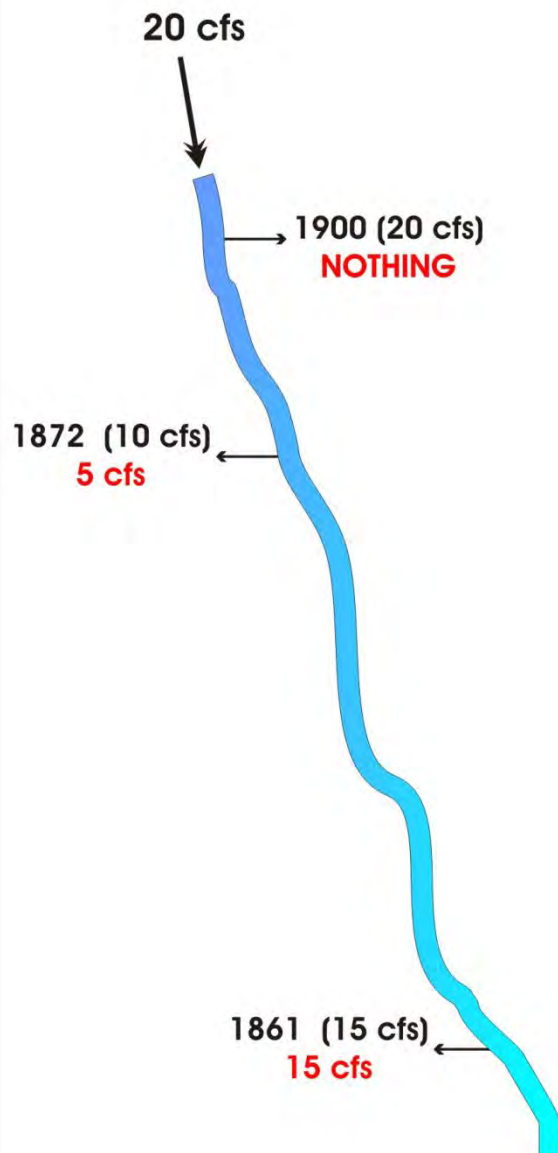
DIRECT FLOW RIGHTS



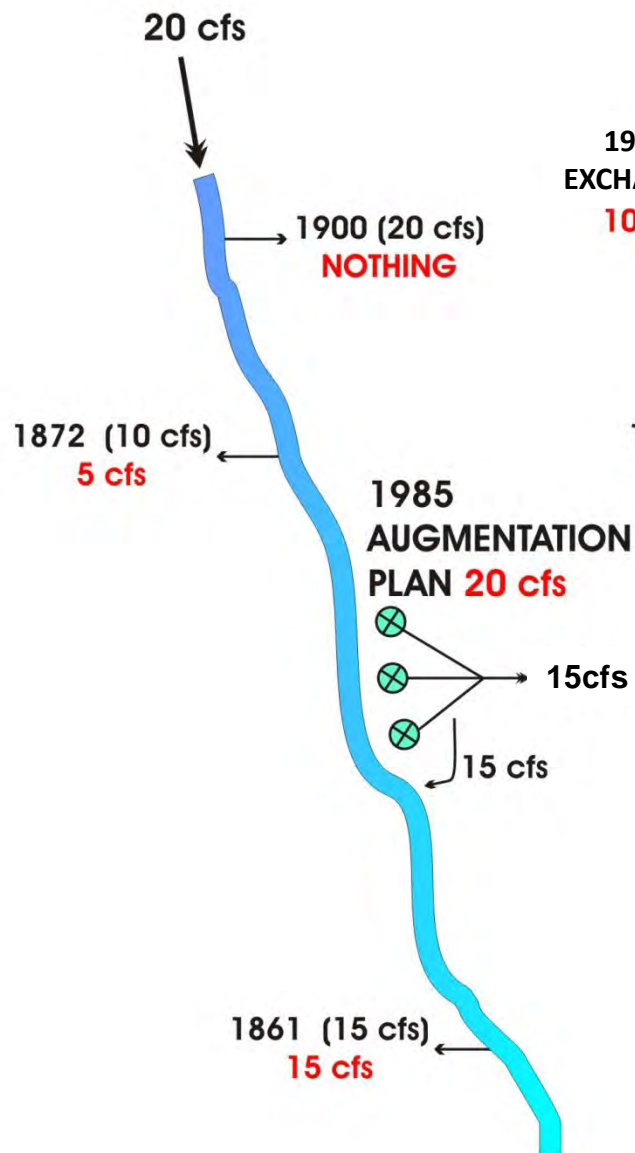
AUGMENTATION PLAN



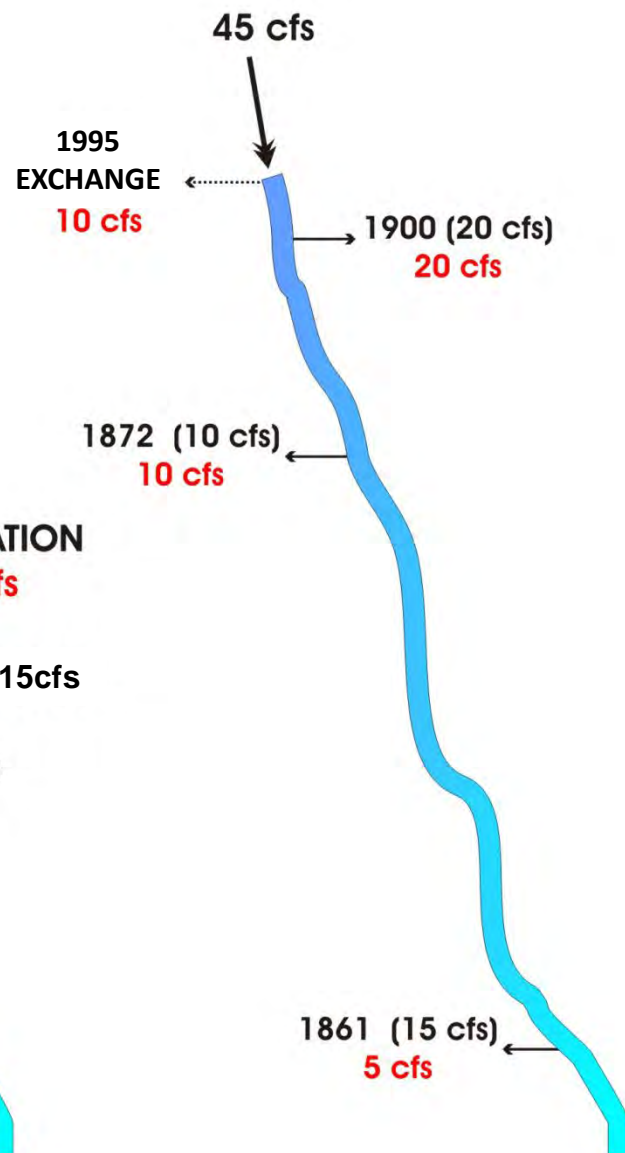
DIRECT FLOW RIGHTS



AUGMENTATION PLAN



EXCHANGE

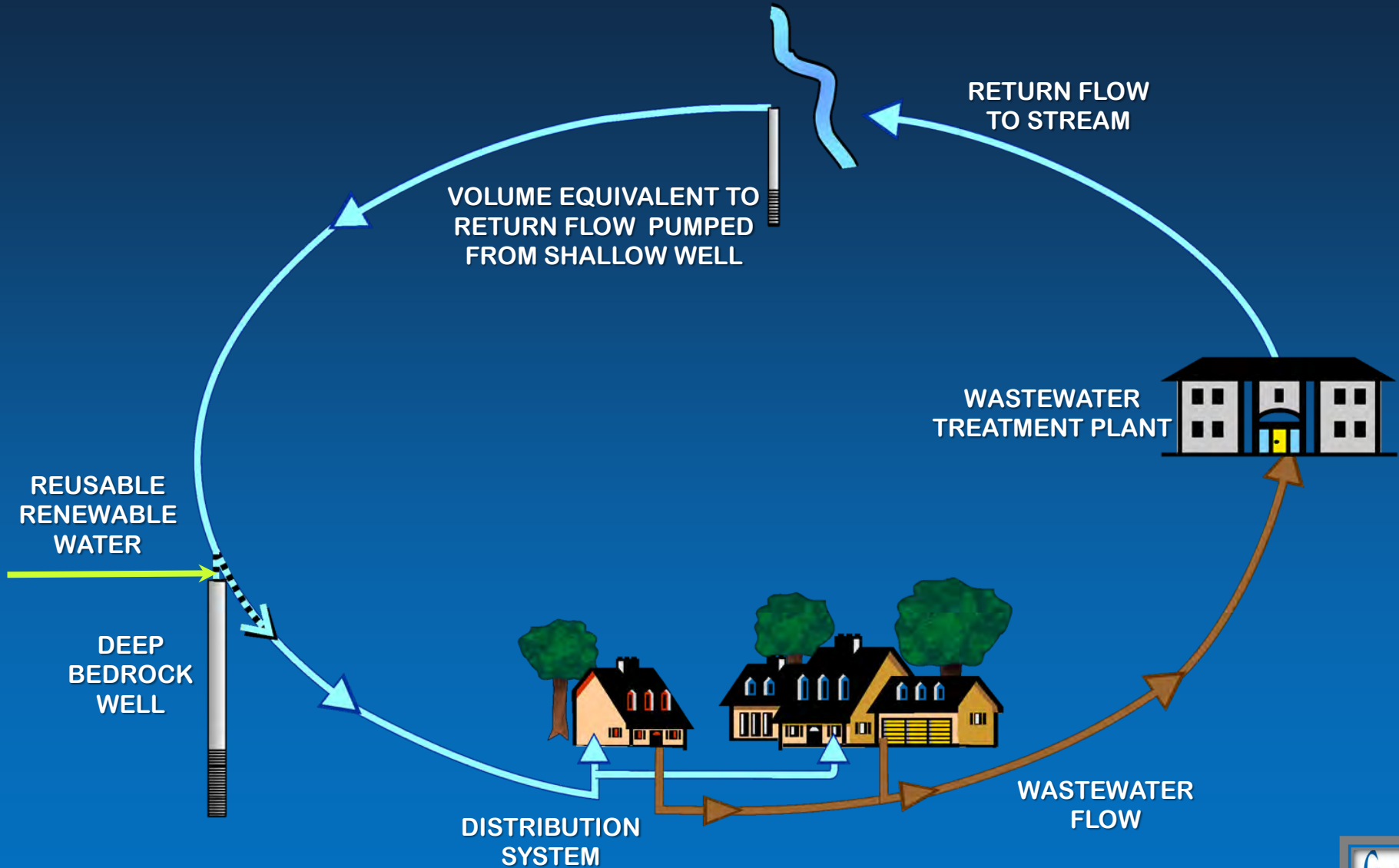


WATER STORAGE

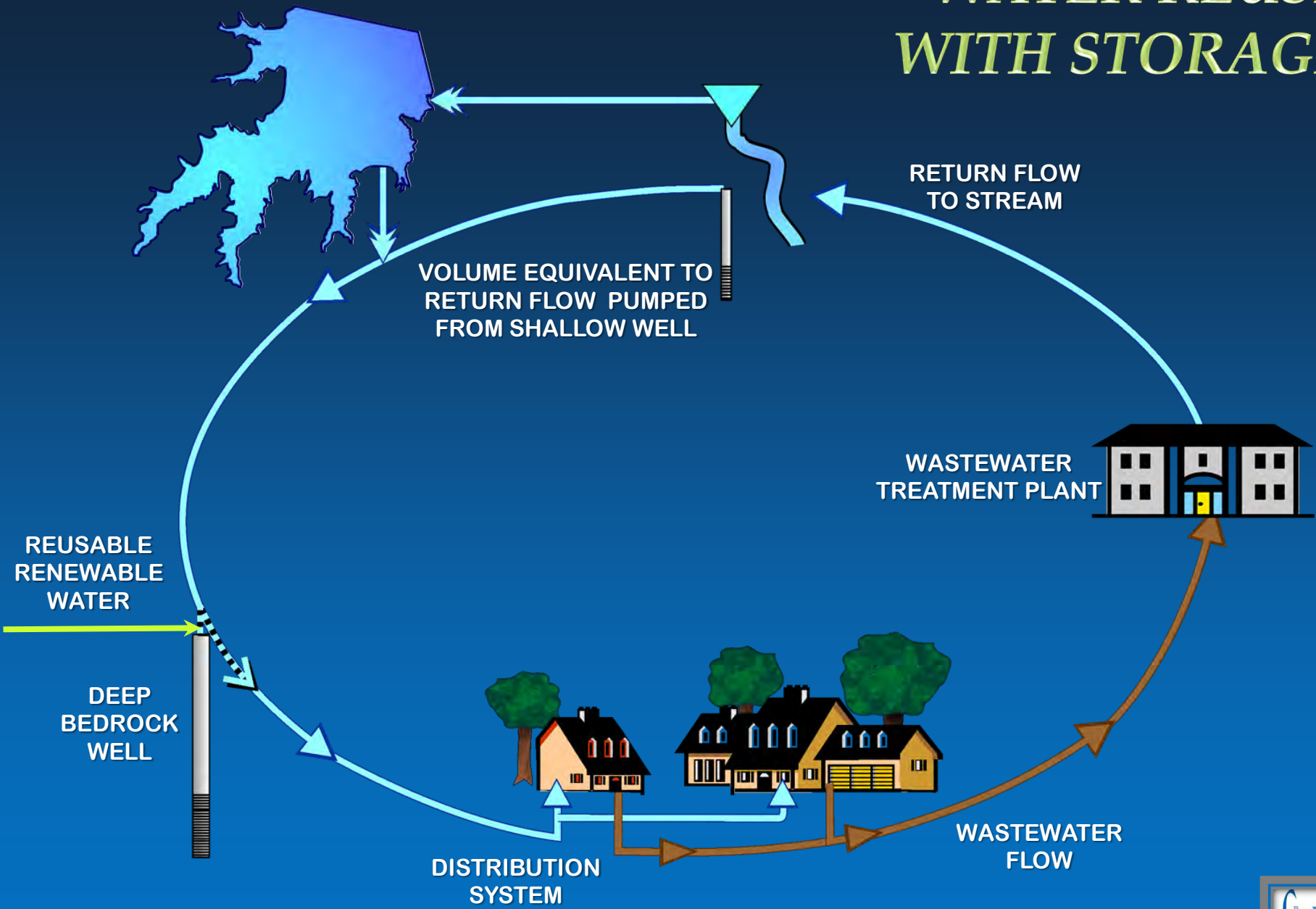
- SUPPLEMENT DIRECT FLOW, DENVER BASIN, AUGMENTATION, AND EXCHANGE RIGHTS
- RE-TIMES WATER FROM FLOW AVAILABILITY TO DEMANDS
- EFFICIENT WATER MANAGEMENT TOOL



WATER REUSE



WATER REUSE WITH STORAGE

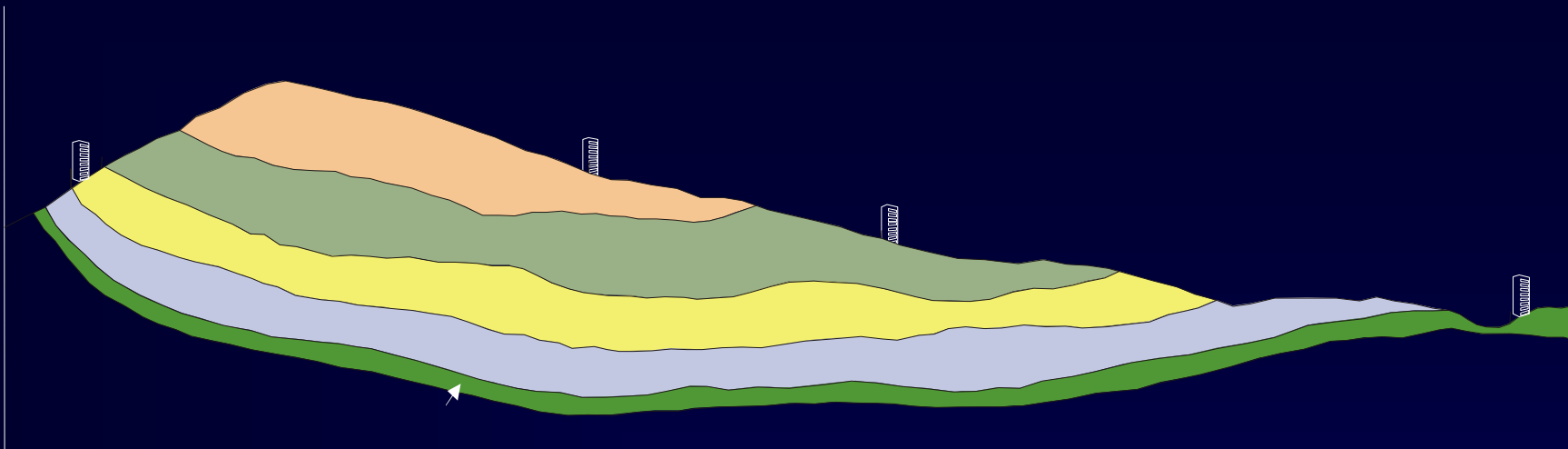


NONTRIBUTARY GROUND WATER RIGHTS

- MOST WATER IN COLORADO IS PRESUMPTIVELY TRIBUTARY
- DENVER BASIN IS ONLY AREA WHERE WATER IS PRESUMPTIVELY NONTRIBUTARY
- NOT SUBJECT TO PRIORITY SYSTEM
- NON-RENEWABLE WATER RESOURCE



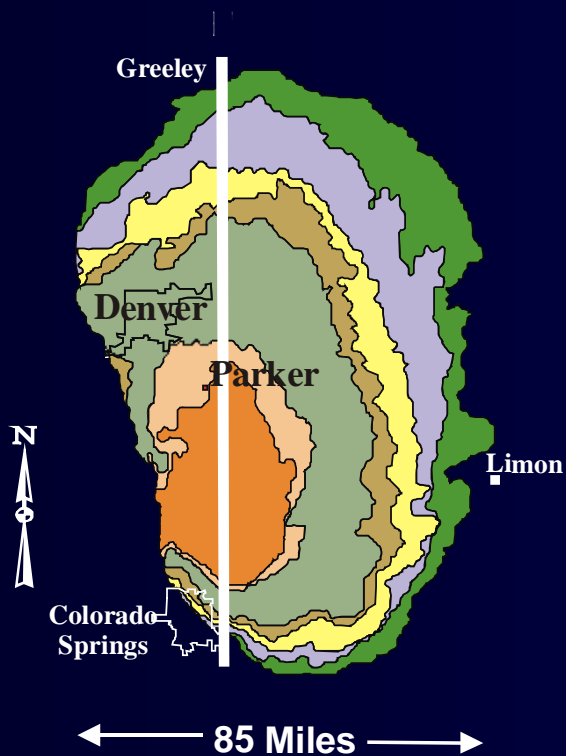
CROSS-SECTION OF DENVER BASIN



VERTICAL EXAGGERATION X32

RECOVERABLE VOLUME OF WATER IN STORAGE

DAWSON	27,000,000
DENVER	42,000,000
ARAPAHOE	80,000,000
LARAMIE-FOX HILLS	<u>110,000,000</u>
TOTAL	= 259,000,000

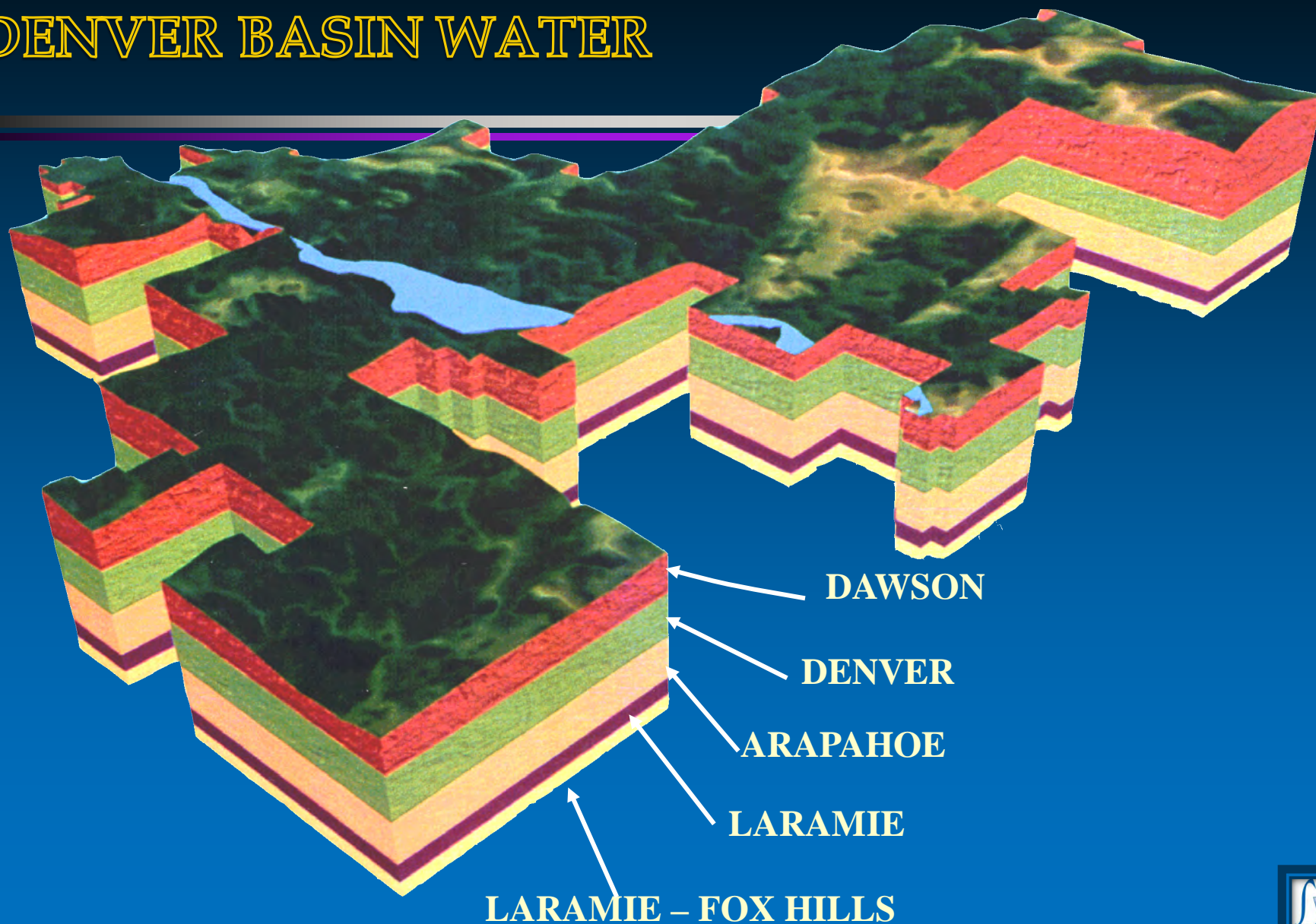


DENVER BASIN WATER

- ✓ Can produce 1% of water in storage beneath land annually (100-year life)



APPROPRIATION OF DENVER BASIN WATER

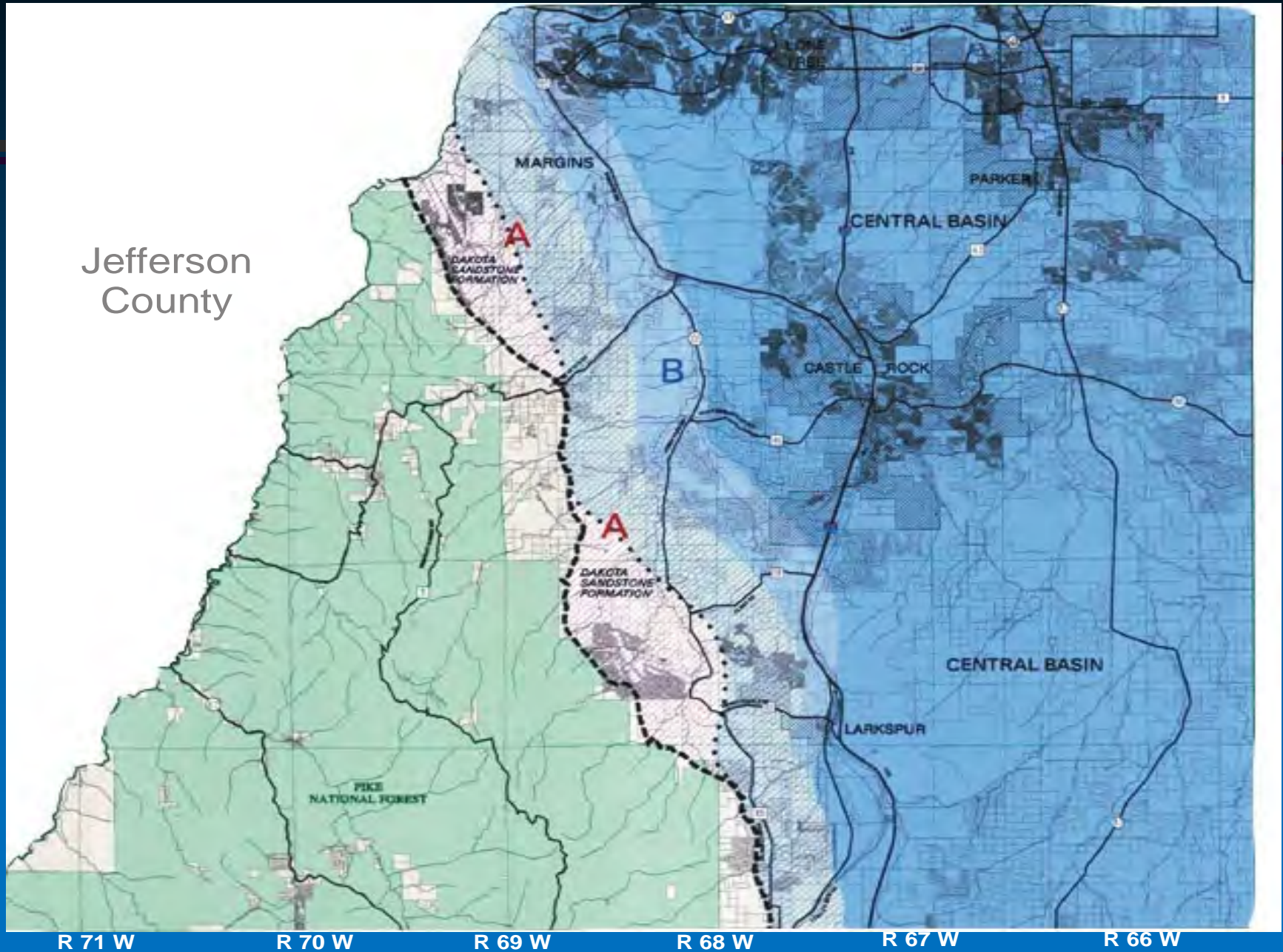


DENVER BASIN WATER

- ✓ Can produce 1% of water in storage beneath land annually (100-year life)
- ✓ Water is reusable to extinction
- ✓ Permit to drill well can be obtained from SEO by showing ownership of water
- ✓ Don't need a Water Court decree prior to use (except for not-nontributary water)



DOUGLAS COUNTY WATER SUPPLY STANDARDS MAP



T 6 S

T 7 S

T 8 S

T 9 S

T 10 S

R 71 W

R 70 W

R 69 W

R 68 W

R 67 W

R 66 W

ASR IS A PROVEN TECHNOLOGY FOR THE DENVER BASIN AQUIFERS

- ✓ **EXTENSIVE TECHNICAL RESEARCH**
- ✓ **PRACTICAL TECHNICAL APPLICATIONS**
- ✓ **INSTITUTIONAL FRAMEWORK**

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF THE STATE ENGINEER

DENVER BASIN
ARTIFICIAL RECHARGE EXTRACTION RULES

1995

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ASR IS A PROVEN TECHNOLOGY FOR THE DENVER BASIN AQUIFERS

- ✓ **EXTENSIVE TECHNICAL RESEARCH**
- ✓ **PRACTICAL TECHNICAL APPLICATIONS**
- ✓ **INSTITUTIONAL FRAMEWORK**
- ✓ **GREAT FLEXIBILITY**
 - **EXTRACTION UP TO 5 MILES AWAY (IF CONTIGUOUS)**
 - **BANKED INDEFINITELY**
 - **ALLOWS 100% RECOVERY OF WATER IN STORAGE**



TRIBUTARY WATER RIGHTS VALUATIONS

- ✓ TYPICALLY DONE SEPARATELY FROM LAND APPRAISALS
- ✓ WATER IS A SEPARATE REAL-PROPERTY INTEREST
- ✓ MANY TIMES WATER IS THE MOST VALUABLE ASSET
- ✓ EVALUATED ON HIGHEST AND BEST USE



TRIBUTARY WATER RIGHTS VALUATION PROCESS

- UNDERSTANDING OF LEGAL RIGHT(S)
- EVALUATING HISTORIC PHYSICAL
MANIFESTATION OF USE OF RIGHTS
- TYPICALLY INVOLVES A CHANGE OF USE
 - MOST SENIOR RIGHTS ARE IRRIGATION
ONLY
 - HIGHEST AND BEST USE TYPICALLY NOT
IRRIGATION



CHANGE OF USE OF TRIBUTARY WATER RIGHTS

- DECREED AMOUNT IRRELEVANT, EXCEPT CONDITIONS CAN'T BE EXCEEDED
- ACTUAL USE PARAMOUNT
- ONLY PORTION HISTORICALLY CONSUMED CAN BE CHANGED
- HISTORIC RETURN FLOW PATTERNS HAVE TO BE MAINTAINED



VALUATION

- RESULTS OF HCU ANALYSIS = THE AMOUNT TO BE VALUED
 - COMPARABLE SALES
 - PRIORITY
 - HISTORIC USE
 - RELIABILITY
- VALUE INCREASING WITH GROWING STRESS ON LIMITED SUPPLIES



NONTRIBUTARY WATER RIGHTS VALUATION

- ❖ NOT VERY FREQUENT TODAY
- ❖ MOST DENVER BASIN TRANSACTIONS ARE IN EXCHANGE FOR SERVICE
- ❖ VALUATIONS MORE STRAIGHTFORWARD AS THEY ARE NOT SUBJECT TO THE APPROPRIATION DOCTRINE
- ❖ TYPICALLY ARE ADJUDICATED FOR MULTIPLE USES
- ❖ VALUE IS STAGNANT, IF NOT DECLINING



SUMMARY

NEED TO UNDERSTAND:

- ☞ TYPE OF WATER SUPPLY AVAILABLE (RENEWABLE, NON-RENEWABLE)
- ☞ TYPE OF RIGHT
- ☞ PHYSICAL AND LEGAL AVAILABILITY
- ☞ RELIABILITY OF WATER UNDER ALL HYDROLOGIC CONDITIONS
- ☞ SUSTAINABILITY
- ☞ HOW TO MANAGE SYSTEM TO MAXIMIZE BENEFICIAL USE



THANK YOU!

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